Product Specifications

Models:
SC60021T, SC60022T
SC80021T, SC80022T
SC11021T, SC11022T

Guide Specification for UniStar® P Series

Tower 6, 8, 10Kva
Single-Phase, On-Line Double Conversion
Uninterruptible Power Supply

11-19-10

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SECTION 1.0
SCOPE AND SYSTEMS RATINGS

1.1 Specification

This specification defines the electrical and mechanical characteristics and requirements for a continuous duty, single-phase, tower design uninterruptible power system. The specification identifies 6Kva, 8Kva and 10Kva double conversion equipment, hereafter referred to as the UPS.

The UPS shall utilize "true on-line" pulse width modulated (PWM) inverter incorporating Isolated MOSFET technology. The inverter is a microprocessor controlled, solid-state device within the uninterruptible power system. The uninterruptible power system, hereafter referred to as the UPS, shall provide high quality AC power for sensitive electronic equipment loads.

The UPS shall consist of a rectifier/charger, battery, inverter, protective devices, static transfer switch, synchronizing and phase lock circuitry, and controls required to provide regulated, uninterrupted, conditioned power to the critical load.

The UPS shall include all mechanical and electrical devices that will automatically provide continuity of electrical power within the defined limits without interruption, failure or degradation of the commercial power source. Continuity of conditioned electric power shall be maintained for the defined period of time by the battery system. Upon return of the utility power source, the UPS shall automatically assume the load, while simultaneously recharging the batteries. The UPS shall provide paralleling capability for up to four individual units, either for added capacity or for redundancy.

The UPS shall be capable of paralleling up to (4) UPS Modules for 40kva capacity or 30kva N+1 redundancy without additional parallel cabinet. Connection by RJ45 paralleling cable.

1.2 UPS Modes of Operation

The UPS shall be designed to operate as an on-line reverse transfer system in the following modes:

1.2.1 Normal: The critical AC load is supplied continuously by the inverter. The rectifier/charger derives power from a utility AC source and supplies DC power to the inverter while simultaneously float charging a battery system. The inverter converts the DC power into clean and regulated AC power that is then supplied to the critical load through the static transfer switch.

1.2.2 Emergency: Upon failure or degradation of the utility AC power, the critical AC load supplied by the inverter will draw its power from the batteries. There shall be no interruption of power switching from utility AC power to batteries or while switching from batteries back to utility AC power upon its restoration. While the battery powers the UPS, indication for actual battery backup time shall be provided.

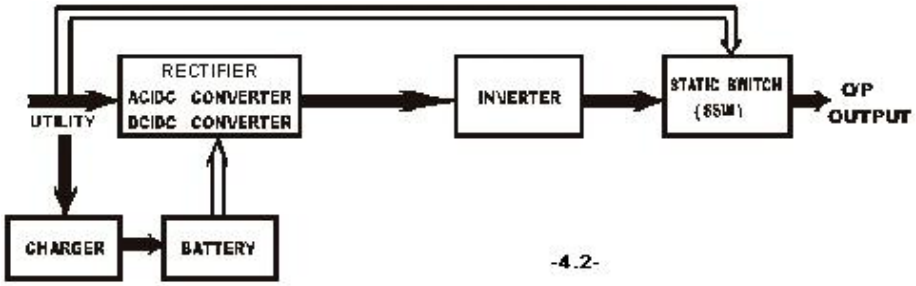
1.2.3 Recharge: Upon restoration of utility AC power, even if the batteries are completely discharged, the UPS will restart. The rectifier/charger shall assume the inverter and battery recharge loads. If the bypass source is within acceptable limits, the UPS will retransfer the critical load back to the inverter.

1.2.4 Bypass: When the inverter overload capacity is exceeded, the static transfer switch shall perform a transfer of the load from the inverter to the bypass source with no interruption in power to the critical load.

1.2.5 Maintenance Bypass: If for some reason the UPS has to be taken out of service for maintenance or repair, the UPS shall be provided with an optional, external maintenance bypass switch to enable a load transfer from the inverter to the bypass source with no interruption of power to the critical load.

Utility Normal

The working principle of the UPS under Utility normal condition is illustrated as follows:



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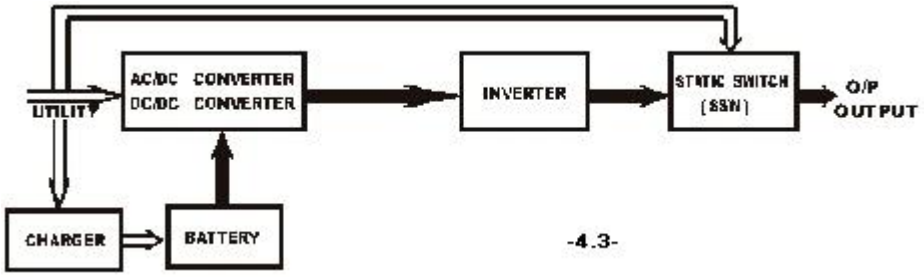
When Utility is normal, the AC source is rectified to DC, partially fed into the charger to charge battery and partially fed into inverter. The inverter revert the DC to a cleaned and pure AC to supply energy to the load connect.

Utility Absent

The working principle of the UPS under Utility abnormal condition is illustrated as follows:



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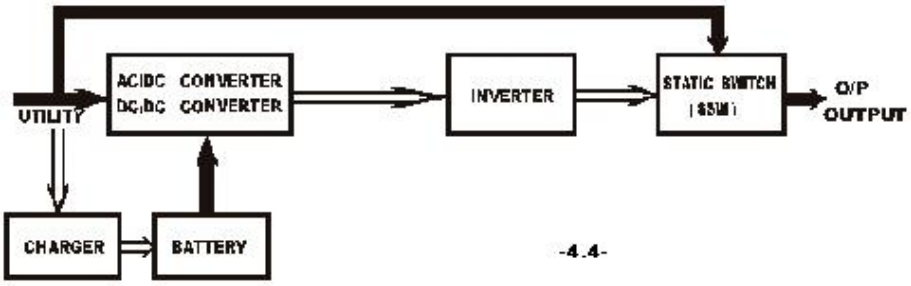
1. When Utility is abnormal, the UPS will direct the battery energy automatically to the Inverter without delay, and turn off the charger and AC/DC converter. The inverter revert DC to AC to supply energy to the output load connected without interruption.

2. When Utility is back to Normal, the UPS will turn on the AC/DC converter, turn off DC/DC converter and switch the charger to charging mode.

3. When Battery is low, alarm will beep continuously till battery is completely cut off. The battery low protection of the UPS will cut off battery supply after a preset threshold to avoid the battery from over-drain. The Battery Low LED's will light up till the UPS is completely cut off. The UPS will re-start automatically when Utility is available.

Overload Condition

The working principle of the UPS when overloading is illustrated as follows



1. Generally modern day electronics & IT equipment generate an inrush current when switching on. The amount of inrush current varies from equipment to equipment, some can be as high as 6 times its rated capacity while others produce negligible inrush. To prevent severe damage to its Inverter cause by the inrush produce by the loads, the UPS is equipped with electronics overload protection feature as standard. If the UPS loading is >105~120% of its capacity, it will switch to bypass mode in 30 seconds to protect the Inverter. If overload condition is eliminated by reducing the load to <105%, the UPS will switch back to Inverter mode automatically. If the UPS is over 150% loading, it inverter will shutdown immediately.

Inverter Failure Output Load short circuit when supply via inverter

If output load is short circuited while supply via Inverter, the UPS will shutdown Inverter automatically and stop supply to the loads. The Fault LED lights up and the alarm will beep continuously. The UPS will not switch on automatically after short circuit condition is eliminated. The UPS has to be re-start manually.

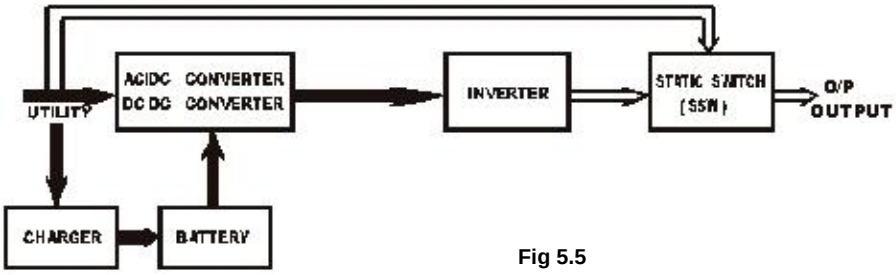


Fig 5.5

Inverter/Internal Over temperature

If the UPS experiences internal over-temperature when Utility is normal, it will switch to bypass loop. The UPS will switch back to inverter mode when the over-temperature situation is eliminated. If over temperature occurs when Utility is abnormal, the alarm will beep continuously and the Fault LED will light up. The UPS will cut off supply to the loads.

Current and Inverter Output Voltage Out of tolerance

If the UPS inverter delivers over-current and out-of-tolerance voltage to its outlets, the UPS is out of order. The UPS will switch to bypass loop when Utility is normal. The Utility, Bypass and Fault LED's will light up. If these two fault conditions occur when Utility is abnormal, the UPS will cut off the supply to its outlets and the Fault LED will light up.

1.3 System Ratings

1.3.1 Input

Ratings:		6kVA, 8kVA and 10kVA
Connection:	6kVA	Hardwire / Optional 6ft. Line Cord with L6-30P Plug
	8kVA	Hardwire
	10kVA	Hardwire
Voltage Range:		160 -280Vac
Frequency:		45 ~ 65 Hz
Phase/Wire:		Single, Line + Common + Ground
Power Factor:		Up to 0.99 at 100% Linear Load
Current THD:		<5% at 100% Linear Load

1.3.2 Output

Connection:	6kVA	Hardwire
	8kVA	Hardwire
	10kVA	Hardwire
Voltage:	21T Models	208/120 or 240/120
	22T Models	208/220/230 or 240
Voltage Adjustment:		+/- 0%; +/- 1%; +/- 2%; +/- 3% For All Voltages
Voltage Regulation:		+/- 2%
Capacity:		6000VA/4200W, 8000VA/5600W, 10000VA/7000W
Parallel Capability:		Redundancy or Capacity – 4 Units Maximum
Rated Power Factor:		0.7 Lagging
Waveform:		Sine Wave, THD < 3% (no load to full load)
Frequency Stability:		+/- 0.2% (Free Running)
Frequency Regulation:		+/- 1 Hz
Transfer Time:		0ms/instantaneous
Crest Factor:		3:1
Efficiency (AC to AC Nominal):		91%
Efficiency (AC to AC ECO Mode):		Up to 97%
Leakage Current:		< 3mA @ Full Load
DC Start:		Yes
Cooling:		Load Dependant Variable Speed Fans
Full Load Heat Rejection BTU/hr:		6kva:1,472 8kva: 1,890 10kva: 2,363

1.3.3 Internal Battery

Internal battery shall be maintenance-free sealed type to minimize the need for servicing. Battery shall be hot-swappable design, allowing users to replace the batteries without the hazard of electrical shock or interruption to the connected load. The UPS shall continue to supply power during such servicing, as applicable.

Battery Run Time @Full Load (Minutes):	
6kVA	8
8kVA	7
10kVA	5
Type:	Sealed Lead Acid
Qty./Description:	
6kVA	20 each 12V/7AH, 240Vdc
8kVA	20 each 12V/9AH, 240Vdc
10kVA	20 each 12V/9AH, 240Vdc
Hot – Swap Batteries:	Yes
Recharge Time:	
6 and 8kVA	4 hours to 90%
10kVA	5 hours to 80%

SECTION 2.0
ENVIRONMENTAL

2.1 Environmental

Temperature:	0C – 40C
Altitude:	0 - 2,000 m up to 40° C. 3,000 m up to 35° C
Humidity:	90% RH Maximum, Non-Condensing
Audible Noise:	<50dbA (1 meter)

SECTION 3.0
GENERAL REQUIREMENTS

3.1 System Description

3.1.1 Rectifier/Charger

The rectifier section shall be capable of receiving utility input and rectifying it to produce Direct Current (DC) power at levels sufficient enough to supply the load via the inverter, and recharge the battery.

3.1.2 Inverter

The inverter section of the power converter module shall utilize MOSFET technology. This solid-state device that incorporates pulse width modulation (PWM) technology is capable of accepting the output of the rectifier/charger or the battery system voltage and delivering AC power within specified limits to the critical load bus. The inverter shall be microprocessor controlled and include all necessary timing logic and control circuits.

3.1.3 Static Transfer Switch

An internally mounted static transfer switch and bypass circuit shall be provided as an integral part of the UPS. The static switch shall be high speed power electronic devices rated to conduct full load current continuously while on inverter or bypass power. The static switch shall include all necessary logic circuitry for fully automatic frequency synchronization and phase locking of the UPS inverter output to the bypass/reserve power source.

SECTION 4.0
WIRING AND CONNECTIONS

Wiring practices, materials and coding shall be in accordance with the requirements of the National Electric Code, NFPA 70 and other applicable codes and standards

SECTION 5.0
MECHANICAL STANDARDS

5.1 Cabinet Description

The UPS unit, comprised of the rectifier/charger, inverter, static transfer switch shall be housed in an enclosure offering indoor protection.

	SC60021T	SC60022T	SC80021T	SC80022T	SC11021T	SC11022T
Dimensions (WxDxH) 11.4" x 25.4" x 29.5"	**X**	**X**		**X**		**X**
Dimensions (WxDxH) 11.4" x 25.4" x 34.7"			**X**		**X**	
Weight (lbs)	**265**	**190**	**320**	**203**	**340**	**223**

SECTION 6.0
MONITORING, CONTROLS, ALARMS AND COMMUNICATION

6.1 General

The UPS unit shall incorporate the necessary controls, instruments and indicators to allow the operator to monitor the system status and performance, as well as take any appropriate action. The communication port on the rear panel of the UPS shall be RS232 serial type, allowing for computer connection to monitor the status of the UPS, and allow for the control and operation of the UPS. Communication software will provide for use with MS Windows.

Status On LED + LCD	Line Mode, Backup Mode, ECO Mode, Bypass Supply, Battery Low, Battery Bad/Disconnected, Overload, Transferring with interruption & UPS Fault
Readings On LED + LCD	Input Voltage, Input Frequency, Output Voltage, Output Frequency, Load Percentage, Battery Voltage & Unit's Inner Temperature
Self-Diagnostics	Upon Power-on, Front Panel Setting & Software Control, 24 Hour self check
Audible Alarms and Visual	Line Failure, Battery Low, Transfer to Bypass, System Fault Conditions
Communications	RS232 Serial Port (2 slots available for optional SNMP/WEB, USB or Dry Contact Card)
Emergency Power Off (EPO) Connection	Emergency Power Off shuts down UPS when activated by customer supplied EPO Circuit

SECTION 7.0
STANDARDS

7.1 Applicable Documents

The UPS shall be designed in accordance with the applicable sections of the current revision of the following documents.

Listing UL1778, c-UL; CE – FCC Class A

SECTION 8.0
OPTIONS

8.1 Battery

A storage battery pack shall be used to provide the system with extended operational run times. Battery shall be hot-swappable design. Battery run times shall be as follows:

Extended Battery Run Times (minutes)

40 X Cabinet (2 strings)

		Qty. of Cabinets	25% Load	50% Load	75% Load	100% Load
6 kVA	Internal	0	56	22	12	8
		1	226	95	56	38
		2	420	180	109	75
		3	629	273	166	116
		4	847	370	226	158
		5	1073	471	289	203

		Qty. of Cabinets	25% Load	50% Load	75% Load	100% Load
8 kVA	Internal	0	64	21	12	7
		1	216	91	54	37
		2	402	172	104	72
		3	602	261	158	110
		4	812	354	216	151
		5	1028	451	276	194

		Qty. of Cabinets	25% Load	50% Load	75% Load	100% Load
10 kVA	Internal	0	40	15	8	5
		1	164	68	40	27
		2	307	131	78	54
		3	461	198	120	83
		4	623	270	154	114
		5	790	345	210	147

60 X Cabinet (3 strings)

		Qty. of Cabinets	25% Load	50% Load	75% Load	100% Load
6 kVA	Internal	0	56	22	12	8
		1	321	137	82	56
		2	629	273	166	116
		3	959	420	257	180
		4	1305	576	354	249
		5	1660	737	454	321

		Qty. of Cabinets	25% Load	50% Load	75% Load	100% Load
8 kVA	Internal	0	64	21	12	7
		1	307	131	78	54
		2	602	261	158	110
		3	919	402	246	172
		4	1251	551	338	238
		5	1594	706	435	307

		Qty. of Cabinets	25% Load	50% Load	75% Load	100% Load
10 kVA	Internal	0	40	15	8	5
		1	234	98	58	40
		2	461	198	120	83
		3	706	307	187	130
		4	963	422	258	181

8.2 External Battery Charger

An external battery charger shall be available for increasing the recharge time when multiple external battery cabinets are installed.

1000W External Mount Battery Charger (1) charger per every (2) External Battery Packs rcommended. 3.4”H x 6.6”W x 11.1”D Weight 7 lbs.

8.3 Maintenance Transfer Bypass Switch (MTBS)

A manually operated, external bypass switch shall provide for continuous power to the critical load, when maintenance procedures are necessary, for either scheduled or unscheduled events. Ratings shall be as follows:

Output Voltage: 208/208 or 240/240 or 208/120Vac or 240/120Vac
Manual Bypass Switch: Make – Before – Break

MTBS Bypass for Two (2)-6KVA or One (1)-(8 or 10KVA) UPS Modules 60 Amp
3.7”H x 10.5”W x 9.5”D Weight 11 lbs.

MTBS Bypass for Four (4)-6KVA or Two (2)-(8 or 10KVA) UPS Modules 120 Amp
3.7”H x 10.5”W x 16.4”D Weight 20 lbs.

MTBS Bypass for Four (4)-(8 or 10KVA) UPS Modules 200 Amp
3.7”H x 10.5”W x 16.4”D Weight 23 lbs.

8.4 Communications

The UPS shall have (2) card slots available to receive any (2) optional communication cards with (2) cards operational simultaneously:

SNMP/WEB kit to include **SNMP/Web browser adapter card**, MIB software, interface cable and operators manual. Support HP Open View, Sun SunNet Manager, IBM NetView, Novell NMS, Accton AccView and other SNMP Compliant NMS's, and/or **USB Interface Card** and**/**or **Opto- coupler type Dry Contact Card, DB9 (AS/400)** and/or **Internal Relay Contact Board Card**, True Relay 10 Pin.

SECTION 9.0
FACTORY TESTING

9.1 Factory Testing

Before shipment, the manufacturer shall completely test the system to factory standards to assure compliance with the specification.

SECTION 10.0
INSTALLATION AND OPERATION DATA

10.1 Operating and Maintenance Manuals

The specified UPS system shall be supplied with one copy of the User's Manual. Additional copies may be downloaded from manufacturers web site or ordered at an additional charge from the manufacturer.

SECTION 11.0
LIMITED WARRANTY

11.1 UPS and Battery Limited Warranty

The UPS parts with depot repair warranty shall be in effect for 24 months. The battery shall provide for a one year warranty, prorated for a period of four years.

SECTION 12.0
QUALIFYING EXPERIENCE

12.1 Qualifying Experience

The manufacturer shall have a minimum of ten years experience in the design, manufacture, and testing UPS systems. This specification outlines the minimum requirements for a UPS. Every supplier shall provide a specification compliance statement with its proposal referencing each section of this specification.

12.2 Approved Manufacturer

Staco Energy Products Company

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